MOBILE BRAIN IMAGING IN ECOLOGICAL CONDITIONS TO STUDY SPATIAL COGNITIVE AGING

Mots clés :
- Directeur de thèse : angelo ARLEO
- Co-encadrant(s) :
- Unité de recherche : Institut de la Vision
- Ecole doctorale : École Doctorale Informatique, Télécommunications, Électronique de Paris
- Domaine scientifique principal : Sciences pour l’ingénieur

Résumé du projet de recherche (Langue 1)

Our brain relies extensively on visual information to interpret and interact with the environment. Thus, the characterization of age-related changes at every level of the visual pathway (from the imaging structures of the eye to the brain regions mediating visual perception and cognition) is of particular importance to uncover possible causal relations between sensory and cognitive dysfunctions. This doctoral work proposes to study the consequences of healthy aging on the action-perception loop, with a focus on the interplay between visual and cognitive age-related modifications. To investigate these questions, we will focus on spatial cognition, which provides an ideal framework of study, being deeply reliant on the visual function. Spatial cognition is indeed at the crossroads of the multi-scale, complex processes involved in the action-perception loop. Active visual exploration, integration of visual percepts with other sensory modalities, processing and memorization of the most relevant information are all crucial functions supporting decision making and navigation planning. It has been clearly established that aging affects visuo-spatial cognition both structurally (hippocampal and entorhinal regions) and functionally, for example in the use of visual information to solve complex navigation tasks. Moreover, impairments in spatial navigation and orientation (e.g., spatial disorientation and wayfinding issues) have a detrimental impact on older adults’ autonomy and well-being, including decreased mobility and increased avoidance of unfamiliar environments. This doctoral work will investigate how the manifold changes induced by aging alter the neural correlates of spatial behavior in natural, real-life, situations. We will conduct ecological studies of the neural correlates of aging by using mobile EEG recordings to study the link between the effect of aging on the brain rhythms and its role in visual-spatial cognition.